



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

EXAMINER

ART UNIT	PAPER NUMBER
----------	--------------

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

BEST AVAILABLE COPY

Office Action Summary

Application No.

09/318,045

Applicant(s)

NEUHAUSER ET AL.

Examiner

Martin Lerner

Art Unit

2641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 to 18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 to 18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Specification does not enable one of ordinary skill in the art to know what constitutes a "non-linear function" of the first and second signal values. Certainly, there are many sorts of non-linear functions of two variables (e.g. quadratic or trigonometric functions), but the Specification does not provide any concrete examples of how this might be carried out so as enable one of ordinary skill to make and use the invention. Nor does the Specification describe why one might do this.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2641

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 to 3 and 5 to 18 are rejected under 35 U.S.C. 102(b) as being anticipated by *Jensen et al.* ('490).

Regarding independent claims 1 and 13, *Jensen et al.* ('490) discloses a system and method for decoding code symbols in an audio signal, comprising:

"means for receiving first and second code symbols representing a common message symbol, the first and second code symbols being displaced in time in the audio signal" – code symbols encoded in an analog audio signal are received at input terminal 260 (column 21, lines 46 to 49: Figure 11); in one embodiment, the host processor generates a four state data stream, that is, a data stream in which each data unit can assume one of four distinct data states each representing a unique symbol including two synchronizing symbols termed "E" and "S" and two message information symbols "1" and "0" each of which represents a respective binary state (column 10, lines 40 to 58: Figure 4);

"means for accumulating a first signal value representing the first code symbol and a second signal value representing the second code symbol" – the apparatus accumulates data indicating the presence of code components in each of frequency bins of interest repeatedly for at least a major portion of the predetermined time frame interval in which a code symbol can be found (column 21, lines 23 to 34: Figure 11); circuit 320, under control of control circuit 314, accumulates the various code presence signals from the 4N component detector circuits 290 for a multiple number of reset cycles (column 26, lines 17 to 25: Figure 14);

“means for examining the accumulated first and second signal vales to detect the common message symbol” – once DSP 266 has accumulated such data for the relevant time frame, it then determines which of the possible code signals was present in the audio signal (column 21, lines 34 to 45: Figure 11); upon termination of the interval for detection of a given symbol, the code determination logic circuit 320 determines which code symbol was received as that symbol for which the greatest number of components were detected during the interval and outputs a signal indicating the detected code symbol at an output terminal 322 (column 26, lines 25 to 34: Figure 14).

Regarding independent claim 16, *Jensen et al.* ('490) discloses a system for decoding code symbols in an audio signal, comprising:

“an input device for receiving first and second code symbols representing a common message symbol, the first and second code symbols being displaced in time in the audio signal” – code symbols encoded in an analog audio signal are received at input terminal 260 (column 21, lines 46 to 49: Figure 11); in one embodiment, the host processor generates a four state data stream, that is, a data stream in which each data unit can assume one of four distinct data states each representing a unique symbol including two synchronizing symbols termed “E” and “S” and two message information symbols “1” and “0” each of which represents a respective binary state (column 10, lines 40 to 58: Figure 4);

“a digital processor in communication with the input device to receive data therefrom representing the first and second code symbols, the digital processor being

Art Unit: 2641

programmed to accumulate a first signal value representing the first code symbol and a second signal value representing the second code symbol, the digital processor being further programmed to examine the accumulated first and second signal values to detect the common message symbol" -- the apparatus accumulates data indicating the presence of code components in each of frequency bins of interest repeatedly for at least a major portion of the predetermined time frame interval in which a code symbol can be found (column 21, lines 23 to 34: Figure 11); circuit 320, under control of control circuit 314, accumulates the various code presence signals from the 4N component detector circuits 290 for a multiple number of reset cycles (column 26, lines 17 to 25: Figure 14); once DSP 266 has accumulated such data for the relevant time frame, it then determines which of the possible code signals was present in the audio signal (column 21, lines 34 to 45: Figure 11); upon termination of the interval for detection of a given symbol, the code determination logic circuit 320 determines which code symbol was received as that symbol for which the greatest number of components were detected during the interval and outputs a signal indicating the detected code symbol at an output terminal 322 (column 26, lines 25 to 34: Figure 14).

Regarding claim 2, *Jensen et al.* ('490) discloses that for the purpose of detecting the presence and time of symbols, the sum of the values of $SNR(j)$ ("a third signal value derived from the first and second signal values") for each possible synch symbol and data symbol is determined; it is determined whether the sum of its corresponding values $SNR(j)$ is greater than any of the others (column 22, lines 16 to 24).

Regarding claim 3, a sum of the values of $SNR(j)$ is a linear combination of the $SNR(j)$ values for each of the code symbols.

Regarding claim 5, *Jensen et al.* ('490) discloses that each of the symbols is representing by a unique set of code frequency components; the symbol S is represented by a first unique group of ten code frequency components f_1 through f_{10} ; the symbol E is represented by a second unique group of ten code frequency components f_1 through f_{10} ; the symbol 0 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; and the symbol 1 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; (column 10, line 59 to column 11, line 32; Figure 4); a noise level estimate is carried out around each frequency component bin in which a code component can occur; once the noise level for the bin of interest has been estimated, a signal-to-noise ratio for that bin $SNR(j)$ ("component value" "characteristic of a respective frequency component") is estimated by dividing the energy level $B(j)$ in the bin of interest by the estimated noise level $NS(j)$ (column 20, line 43 to column 21, line 22).

Regarding claim 6, *Jensen et al.* ('490) discloses that symbol detection intervals for the decoders may be established based on the timing of synchronization symbols transmitted with each encoded message and have a predetermined order; the decoders are operative initially to search for the presence of the first anticipated synchronization symbol, that is, the encoded E symbol which is transmitted during the predetermined period and determine its transmission interval; the decoders search for the presence of code components characterizing the symbol S, and when it is detected, the decoders

Art Unit: 2641

determine its transmission interval; from this point, the detection of each of the data bits symbols are set (column 26, lines 35 to 59); "S" and "E" are synchronization ("marker") symbols and "1" and "0" are data symbols (column 10, lines 40 to 58: Figure 4).

Regarding claim 7, *Jensen et al.* ('490) discloses a memory 270 for storing the accumulation of detected code symbols (column 21, lines 34 to 42: Figure 11), and DSP 266 decodes a symbol by examining the sum of the values of $SNR(j)$ ("signal values") for each possible synch and data symbol (column 21, lines 46 to 59; column 22, lines 16 to 53: Figure 11).

Regarding claim 8, *Jensen et al.* ('490) discloses that a signal-to-noise ratio for each frequency bin $SNR(j)$ ("signal value") is estimated by dividing the energy level $B(j)$ in the bin of interest by the estimated noise level $NS(j)$ (column 20, line 43 to column 21, line 22); energy level $B(j)$ and noise level $NS(j)$ are "multiple other signal values" which are used to produce signal-to-noise ratios $SNR(j)$ ("signal values").

Regarding claim 9, *Jensen et al.* ('490) discloses that code symbols are repeated during a characteristic time frame interval in which the encoded message has a predetermined duration and order (column 12, lines 28 to 55; column 26, lines 35 to 59: Figure 6).

Regarding claim 10, *Jensen et al.* ('490) discloses that each of the symbols is representing by a unique set of code frequency components; the symbol S is represented by a first unique group of ten code frequency components f_1 through f_{10} ; the symbol E is represented by a second unique group of ten code frequency components f_1 through f_{10} ; the symbol 0 is represented by a further unique group of ten code

Art Unit: 2641

frequency components f_1 through f_{10} ; and the symbol 1 is represented by a further unique group of ten code frequency components f_1 through f_{10} ; (column 10, line 59 to column 11, line 32: Figure 4); a noise level estimate is carried out around each frequency component bin in which a code component can occur; once the noise level for the bin of interest has been estimated, a signal-to-noise ratio for that bin $SNR(j)$ ("component value" "characteristic of a respective frequency component") is estimated by dividing the energy level $B(j)$ in the bin of interest by the estimated noise level $NS(j)$ (column 20, line 43 to column 21, line 22).

Regarding claims 11, 14 and 17, *Jensen et al.* ('490) discloses that a decoder includes an input terminal for receiving the audio signal which may be a signal picked up from a microphone ("acoustic transducer") (column 19, lines 57 to 67: Figure 11); a digital signal processor 266 is coupled to memory 270 for storing the detected code symbols (column 21, lines 34 to 45: Figure 11).

Regarding claims 12, 15 and 18, *Jensen et al.* ('490) discloses that the system may be enclosed in a housing 382 which is sufficiently small in size to be carried on the person of an audience member participating in an audience estimate survey (column 27, lines 34 to 48; column 28, lines 6 to 13: Figure 17).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Jensen et al.* ('490).

Jensen et al. ('490) discloses that the accumulation of code components is performed, and then the code components are combined to produce a third value by summing the values of SNR(j). (Column 21, Line 23 to Column 22, Line 53) Summing is a linear function. *Jensen et al.* ('490) does not expressly disclose accumulating to produce a third value by a non-linear function of the first and second values. However, *Jensen et al.* ('490) suggests that stored data samples may be subjected to a weighting function, such as a cosine squared weighting function, a Kaiser-Bessel function, a Gaussian-Poisson function, or a Hanning function for windowing the data. (Column 21, Line 60 to Column 22, Line 4) These are all non-linear weighting functions. Moreover, it is well known that non-linear functions are recognized alternatives to linear functions, and that non-linear weighting may be performed to emphasize some data samples over other data samples. It would have been obvious to one of ordinary skill in the art to perform non-linear weighting of the data samples as suggested by *Jensen et al.* ('490)

Art Unit: 2641

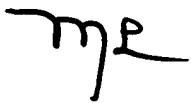
as an alternative to simply summing the values of SNR(j) for the purpose of giving more weight to some data samples than to other data samples.

Conclusion

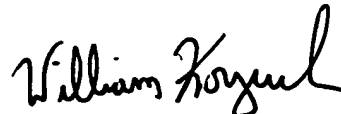
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 9:30 AM to 6:00 PM Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-9508 for regular communications and (703) 305-9508 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.



ml
January 25, 2001



WILLIAM R. KORZUCH
PRIMARY EXAMINER